

Anomis albitibia, Walker, xiii. p. 1001.

Rusicada nigrirtarsis, Walker, xiii. p. 1006.

A small species, very dark, transverse lines quite different to all the others.

Types, Ceylon.

I have examples also from Assam, Ahmednagur, Rangoon, and Perak.

Anomis commoda, Butler, Ann. & Mag. Nat. Hist. (5) i. p. 203 (1878).

A large dark species, with fairly broad fore wings; hind wings dark blackish brown. Quite a good species.

Type, Japan.

I have seven examples from Yokohama and Nikko.

Anomis metaxantha, Walker, xiii. p. 1005.

Paler than *commoda*; fore wing similarly shaped; the genitalia shows that it is quite distinct from all the others.

Type-locality ignotus.

It is a common form in India. I have sixteen examples from Assam, Rangoon, and Bombay.

XXXIII.—*The Cirripede Subgenus Scillælepas; its Probable Occurrence in the Jurassic Rocks (S. gaveyi, sp. n.).* By THOMAS H. WITHERS, F.G.S.

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[Plate XIII.]

MORE than half a century ago the late Mr. G. E. Gavey collected from the Lias at Mickleton Tunnel, near Chipping Campden, Gloucestershire, remains of a Cirripede, which has up till now remained undescribed. Mr. Gavey, however, listed the specimens in 1853 * as "*Pollicipes*; 2 new species," and the late Rev. P. B. Brodie (1857 †), in two short notes,

* G. E. Gavey, "On the Railway Cuttings at the Mickleton Tunnel, and at Aston Magna, Gloucestershire," Quart. Journ. Geol. Soc. London, 1853, vol. ix. p. 34.

† Brodie, Rev. P. B., "On a new Species of *Pollicipes* in the Inferior Oolite near Stroud, in Gloucestershire," Brit. Assoc. Rep. (1856) pt. ii. p. 64; 1857.

Brodie, Rev. P. B., "On the Occurrence of some new Species of *Pollicipes* in the Inferior Oolite and Lias of Gloucestershire," Ann. & Mag. Nat. Hist. ser. 2, vol. xix. 1857, p. 103.

draw attention to the fact that Mr. Gavey had found a new species of *Pollicipes* in the Lias, and this at that time was the earliest-known occurrence of the subclass Cirripedia.

The Cirripede valves from Mickleton Tunnel, now in the Gavey Collection in the Geological Department of the British Museum, number nine in all, and, although four kinds of valve are represented—namely, carina, subcarina, scutum, and tergum,—it would appear from their ornament that all belong to a single species. They are undoubtedly the valves of a pedunculate Cirripede belonging to the family Scalpellidæ, but the generic reference is not so certain. The species is provisionally referred to the subgenus *Scillælepas* of the genus *Calantica* for reasons given below (see p. 261 *et seq.*).

Calantica (Scillælepas) gaveyi, sp. n.

1857. *Pollicipes* sp., Brodie, P. B., Brit. Assoc. Rep. (1856) pt. ii. p. 64.

1857. *Pollicipes* sp., Brodie, P. B., Ann. & Mag. Nat. Hist. ser. 2, vol. xix. p. 103.

Diagnosis.—Capitular valves with regular, widely-spaced, raised ridges or zones of growth, between which are fine transverse and longitudinal lines, and, especially in the lower two-thirds of the valves, with irregular closely-set punctæ—a feature not noticed in any other fossil Cirripede. Carina tapering rapidly towards the apex. Scutum probably triangular, with almost straight widely-spaced ridges. Tergum comparatively long and narrow, with the angles of the zones of growth situated less than one-third the distance from the carinal margin.

Distribution.—Pliensbachian [presumably *daræi*-zone]: Mickleton Tunnel, near Chipping Campden, Gloucestershire.

Holotype.—The carina (In. 18981) figured on Pl. XIII. fig. 2.

Collection.—Collected by the late G. E. Gavey, C.E., F.G.S., and now in the Geological Department of the British Museum, registered In. 18980—In. 18988.

Material.—At least three individuals are represented by the material, which comprises two almost complete carinæ and a fragment of another, one subcarina, five incomplete terga (of which three are right valves and two are left valves), and an impression of part of a scutum. The valves are preserved as an intensely brittle jet-like substance.

Measurements.—Except for the valve considered to be a subcarina, all the valves are somewhat incomplete, and, in the circumstances, to give only their actual measurements

would convey a very inadequate idea as to their size ; probable measurements are therefore given :—

		Actual, in mm.	Probable, in mm.
Carina (In. 18980) . . .	Length	12·4	13·0
	Breadth	4·1 (at about 4 mm. from base).	5·0
Carina (In. 18981) . . .	Length	12·3	14·2 (as shown by impres- sion).
	Breadth	5·2	..
Subcarina (In. 18983).	Length	3·3	..
	Breadth	2·0	..
Tergum (In. 18984) . .	Length	14·4	17·0
	Breadth (circa)	6·0	6·0

Description.—*Carina* semicylindrical, moderately bowed inwards, strongly convex transversely, imperceptibly keeled in its upper half, the valve tapering rapidly towards the apex, which is sharply pointed ; basal margin moderately convex. Outer surface marked with regular, widely-spaced, prominent, raised ridges or zones of growth, which show, especially in one valve (In. 18981), a tendency to become broken up into bead-like prominences. Fine transverse and longitudinal lines are to be seen between the main ridges, but the longitudinal lines are not so well marked as in the terga. The valve is marked, especially in its lower part, with irregular, closely set, fine punctæ.

Scutum.—On the specimen In. 18986, lying near a right tergum, was a badly crushed and shapeless valve, evidently showing its inner surface. At its base could be discerned one or two rather long and straight furrows, and these suggested to me that the fossil represented another kind of valve. It was possible to clear away most of the minute fractured particles of shell, and there was then exposed some eight or nine prominent, straight, equidistant furrows. A plaster-cast taken from this impression shows that the furrows represent the widely-spaced ridges or zones of growth such as are seen on the carina and tergum above, except that they are straighter and longer, and there is no doubt that we have here an impression of the outer surface of a scutum of the type seen in the species known as *Pollicipes aalensis*, *Pollicipes ooliticus*, and *Archæolepas quenstedti*.

Tergum subtriangular, slightly convex transversely, comparatively long and narrow, with prominent, widely-spaced, transverse ridges, which form an acute angle of which the apex is situated about one-third the distance from the carinal margin ; there is no definite apico-basal ridge or fold. Carinal

margin very slightly convex, almost straight, not divided into an upper and a lower portion; oecudent margin gently convex, almost straight, and forming with the carinal margin an angle of about 35° ; scutal margin slightly convex, rather longer than the oecudent margin, with which it makes a rounded angle. The valve is ornamented similarly to the carina, but the longitudinal lines are more apparent.

Subcarina more than half as wide as long, not nearly so strongly convex as the apical portion of either of the two carinæ; basal margin slightly convex. The inner surface of the valve slopes towards the outer surface and forms a sharp edge, so that there is no possibility of this valve being merely the broken off apical portion of a carina.

Systematic Position of Calantica (Scillælepas) gaveyi.

Darwin, in his Monograph (1851), referred the known Jurassic species (*Pollicipes concinnus*, Morris *, *P. ooliticus*, Buckman †, and *P. planulatus*, Morris ‡) to the genus *Pollicipes*. Now the distinguishing characters of *Pollicipes*, which is essentially a recent genus, and evidently a polyphyletic one, is the downward growth of the valves, and their large number (from eighteen to over one hundred). Certainly the valves of the above three species have a downward growth, and since there is evidence in only one species—*P. concinnus*—that the valves numbered more than eighteen, Darwin must have relied on the downward growth of the valves, and almost as certainly on the distinctive characters of the detached valves as compared with those in the genus *Scalpellum*. *Scalpellum* has more modified valves, numbering from twelve to fifteen.

Two further genera have since been established which embrace Jurassic species—namely, *Archæolepas*, Zittel § (1884), and *Pycnolepas*, Withers || (1914), the former including the species *Pollicipes redtenbacheri*, Opperl, *Pollicipes royeri*, de Loriol, and *Pollicipes quenstedti*, von Ammon, and the latter including certain Cretaceous species, together with

* Morris, J., 1845, Ann. & Mag. Nat. Hist. ser. 1, vol. xv. p. 30, pl. vi. fig. 1; Darwin, C. R., 1851, Pal. Soc. Monogr. Lepadidæ, p. 50, pl. iii. fig. 1.

† Buckman, J., 1844, Geol. Cheltenham, p. 95, pl. iii. fig. 7; Darwin, C. R., 1851, Pal. Soc. Monogr. Lepadidæ, p. 50, pl. iii. fig. 2.

‡ Morris, J., 1845, *op. cit.* p. 31, pl. vi. fig. 2.

§ Zittel, K. A. von, 1884, Sitzungsber. k. b. Akad. Wiss. München, Bd. xiv. Heft iv. p. 581.

|| Withers, T. H., 1914, Ann. & Mag. Nat. Hist. ser. 8, vol. xiv. pp. 170, 200.

the Tithonian species *Brachylepas* (?) *fimbriatus* and *B.* (?) *tithonicus*. I have already shown* (1914) that the genus *Scillalepas* existed in the Upper Cretaceous (Upper Senonian and Danian), and it was then pointed out that, although there was no definite evidence, certain of the detached valves described as *Pollicipes* from the Jurassic rocks have much resemblance to the valves of *Scillalepas*.

In *Pollicipes*, *Archæolepas*, *Pycnolepas*, and *Scillalepas* all the valves have a downward growth, so that, in the absence of definite evidence as to their number and disposition, all that one has to go by in referring detached plates to either of those genera is their shape and structure. These are the only criteria we have in placing *S. gaveyi*.

Undoubted species of *Archæolepas* have the carina much reduced in size as compared with the remaining capitular valves; it is somewhat triangular in shape and slightly expanded at the basal angles. Neither the carina nor the terga in *S. gaveyi* are at all like the valves in *Archæolepas*, and the presence of a subcarina, which is absent in that genus, renders it unlikely that it is a species of *Archæolepas*.

There is a superficial similarity in the structure of the carina, principally in the prominent transverse growth-ridges, with that of *Pycnolepas*, but the rounded basal margin shows it to be of a different type of valve. The tergum and scutum are altogether different in structure, thus preventing the species being referred with any confidence to the genus *Pycnolepas*.

S. gaveyi might be referred to *Pollicipes*, for the carina appears to be of much the same shape as the recent species; but the absence of definite evidence as to the number of valves in *S. gaveyi*, the fact that the tergum differs markedly, and that the impression of the scutum shows that the valve was of the same type as in *P. ooliticus*, makes one hesitate to refer the species to *Pollicipes*, more especially so since it would seem that hardly any of the Jurassic or even Cretaceous species can be confidently referred to *Pollicipes*.

Now the terga of *S. gaveyi* are particularly elongate, as are also those of the genus *Scillalepas*. While there is nothing in favour of the reference to *Scillalepas* in the character of the carina, there is nothing opposed to it; but the most convincing of the valves is the scutum, of which, unfortunately, we have only the impression. This, however, shows it to be a valve resembling the scutum of *P. ooliticus* and *P. queenstedti*, and particularly like the scutum in both the recent and fossil species of the genus *Scillalepas*.

If the shape and structure of these detached valves be

* Withers, T. H., 1914, *op. cit.* p. 192.

trustworthy evidence, then the species, *P. ooliticus* and *P. aalensis**, *P. quenstedti*, and *P. (?) lotharingicus* †, Méchin, all of which have valves similar to *S. gaveyi*, are probably nearly related, and belong to *Scillælepas*.

Against this view is the fact that Darwin has described and figured in his Monograph (p. 52, pl. iii. fig. 2 b) a comparatively large rostrum of *P. ooliticus*, similar to but rather wider than the carina. I am not at all sure, however, that in this particular Darwin has allowed sufficiently for variation, and that the valve really is a rather wide carina; a view of the inner surface of the valve would have decided the matter.

Zittel has referred the species *P. quenstedti* to his genus *Archæolepas*, but the valves appear to differ in structure from the valves in *Archæolepas*, and this view is strengthened by the fact that there is among the valves of *P. quenstedti* figured by Max Schlosser (1881) ‡ a rostrum which agrees much more with the rostrum of *Scillælepas*, being decidedly different in shape from the rostrum in undoubted species of *Archæolepas*.

Altogether the evidence, while not conclusive, is in favour of referring *S. gaveyi* to *Scillælepas*, and it is clear that there is no indication of its affinity with *Pollicipes*. I am inclined to think that further material will show this species, together with *Pollicipes ooliticus*, *P. aalensis*, *P. quenstedti*, *P. (?) lotharingicus*, and probably one or two other Jurassic species, to belong to *Scillælepas*, or, at least, to a genus nearly related thereto.

Comparison with other Species.—*Pollicipes (?) lotharingicus*, Méchin, from the *spinatus*-zone of Agincourt (Meurthe-et-Moselle), France, is the only other species known from the Pliensbachian, although it occurs at a somewhat higher horizon than *S. gaveyi*. Only a single carina and tergum are known; the carina appears to be much more attenuated and tapering than *S. gaveyi*; the tergum differs in its proportions, having a shorter occludent margin, which makes a larger angle with the carinal margin, and the sutural margin is proportionally much longer, and the angles formed by the zones of growth appear to have their apices much nearer to the carinal margin. Moreover, the valves do not appear to be marked with longitudinal lines, since no mention is made of them in the description, and nothing is said of the fine

* Richardson, L., 1908, *Geol. Mag.* dec. v. vol. v. p. 352, text-fig.; Withers, T. H., 1911, *Proc. Cotteswold Nat. F. C.* vol. xvii. pt. ii. p. 275.

† Méchin, A., 1901, *Bull. Soc. Sci. Nancy*, ser. 3, vol. ii. fasc. i. p. 16, pl.

‡ Schlosser, Max, 1881, '*Palæontographica*,' Bd. xxviii. p. 60, pl. viii. fig. 8.

punctæ, which form a marked feature in *S. gaveyi*. While it is apparent that *S. gaveyi* differs from *P. (?) lotharingicus*, the figures of the latter species are not good as regards detail, and some mistake appears to have been made in the printing, for the figures in the plate are upside down and the lettering gives the wrong names to the margins of the valves.

Another Liassic species—*Pollicipes rhomboidalis*, Moore*,—from the Hettangian (Sutton Stone), was said to be based on a scutum and carina, although the specimen figured appears to be a tergum and the description of the scutum applies to it. It is not at all like the tergum in *S. gaveyi*, for the valve is subrhomboidal, the carinal margin being divided into an upper and a lower portion. The carina is not described.

The remaining Liassic species is *Pollicipes liasinus*. Dunker †, which is founded on a valve supposed to be a tergum from the Lias of Halberstadt; but it is impossible to determine from the figure whether it is a Cirripede valve at all.

EXPLANATION OF PLATE XIII.

Stramentum pulchellum, G. B. Sowerby, Jun., sp.
Thuronian: Black Head Bay, Co. Antrim, Ireland.

Fig. 1. Holotype of *Loricula macadami*, Wyville Thomson, now in the collection of the Public Art Gallery and Museum, Belfast.

Shell showing the left side uppermost; to the left-hand can be seen the left portion of the *carina*, with the opposing right portion (*c*) projecting from beneath it, the left portion of the carina being followed by the left *carinal latus* (*cl'*), left *tergum* (*t'*), left upper latus (*ul'*), and the left *scutum* (*s'*), the outer basal part of the right scutum (*s*) slightly projecting. Below the carina are six of the left *subcarinal* scales (*cs'*) of the peduncle, followed by incomplete rows of the *carino-lateral*, *upper lateral*, and *scutal* scales of the peduncle, the *subscutal* scales not being present. × 2 diam.

This is in further illustration of my paper on "The Cirripede Genus *Stramentum* (*Loricula*): its History and Structure," Ann. & Mag. Nat. Hist. ser. 9, vol. v. pp. 65-84, pls. iii. & iv.

Calantica (*Scillælepas*) *gaveyi*, sp. n. Pliensbachian [presumably *darvini*-zone]: Mickleton Tunnel, near Chipping Campden, Gloucestershire.

Figs. 2, 3. Carinal valves. × 3 diam. In. 18981, In. 18980.

Fig. 4. Subcarina. × 4.5 diam. In. 18983.

Fig. 5. Tergum (incomplete right valve). × 3 diam. In. 18985.

Figs. 6, 7. Terga (incomplete left valves). × 3 diam. In. 18987, In. 18988.

Fig. 8. Scutum (part of valve as seen in a plaster-cast taken from the natural mould after removal of the crushed shell-fragments). × 2 diam. In. 18986.

* Moore, C., 1867, Quart. Journ. Geol. Soc. London, vol. xxiii. p. 539, pl. xvi. fig. 31.

† Dunker, W., 1848, 'Paleontographica,' vol. i. p. 180, pl. xxv. fig. 14.